Using Autoregressive Epidemic Modeling to Augment the Existing Department of Defense (DoD) Febrile Respiratory Illness Surveillance System at Military Training Centers

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Military trainees have historically been susceptible to outbreaks of febrile respiratory illness (FRI). In the existing Department of Defense (DoD) FRI Surveillance System, a single, fixed epidemic threshold for FRI (1.5 cases/100 trainees/week) has been employed. Mathematical modeling has the potential to provide more sensitive alarm thresholds. Weekly FRI and population counts were recorded at four military training centers. Autoregressive modeling was used to generate expected case counts for the coming week and to set variable weekly alarm thresholds. A combination of variable and fixed alarm thresholds was used to detect FRI epidemics. Alarm status was updated each week as "green" (no epidemic), "yellow" (potential epidemic), or "red" (epidemic). At Fort Jackson, South Carolina, there were 34 (65%) green weeks, 7 (14%) yellow weeks, and 11 (21%) red weeks. The average FRI rates during green, yellow, and red weeks were 0.66, 0.81, and 1.21 cases per 100 trainees, respectively. Of the yellow weeks, 67% progressed to red status within 2 weeks. The current fixed alarm threshold was exceeded only two times during this period; both events were detected as red weeks by the experimental system. Similar results were seen at three other training centers. Autoregressive modeling identified epidemics detected by the current fixed threshold, as well as morbidity peaks below the fixed threshold. The system also correctly warned of approaching epidemics on several occasions. Adjusting the model to optimize sensitivity and specificity is under way. Variable alarm thresholds may be useful adjuncts to the traditional fixed alarm threshold for FRI at military basic training centers.

Development of an Alternative Surveillance Alert Program (ASAP): Syndromic Surveillance of Gastrointestinal Illness Using Pharmacy Over-the-Counter Sales

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A primary aim of community health surveillance is providing timely and accurate information on residents' health status and informing public health action. Presently, in Canada most notifiable infectious diseases are identified through laboratory confirmation. A significant period of time elapses when patients become ill, seek primary health care, and the eventual notification of public health officials. Should there be a severe and sudden introduction of an infectious agent in a community (unintentionally or as an intentional act of bioterrorism), this lag time is the biggest hindrance to implementing effective interventions to control the number becoming ill or even dying. In monitoring daily or weekly community-level pharmacy sales of over-the-counter (OTC) products related to gastrointestinal illness, statistically significant deviations in these sales from historical baselines could provide early warning of a potential outbreak situation. Retrospective case numbers and pharmacy OTC sales from two Canadian outbreaks related to *Cryptosporidium* (North Battleford, Saskatchewan) and *Escherichia coli* O157:H7 (Walkerton, Ontario) are presented in support of the potential for monitoring in this way. Health Canada has outlined a three-phase structure for piloting the implementation of an automated system. The first phase of this Alternative